MOST-UNEP Technical Cooperation on Water Resources in Africa

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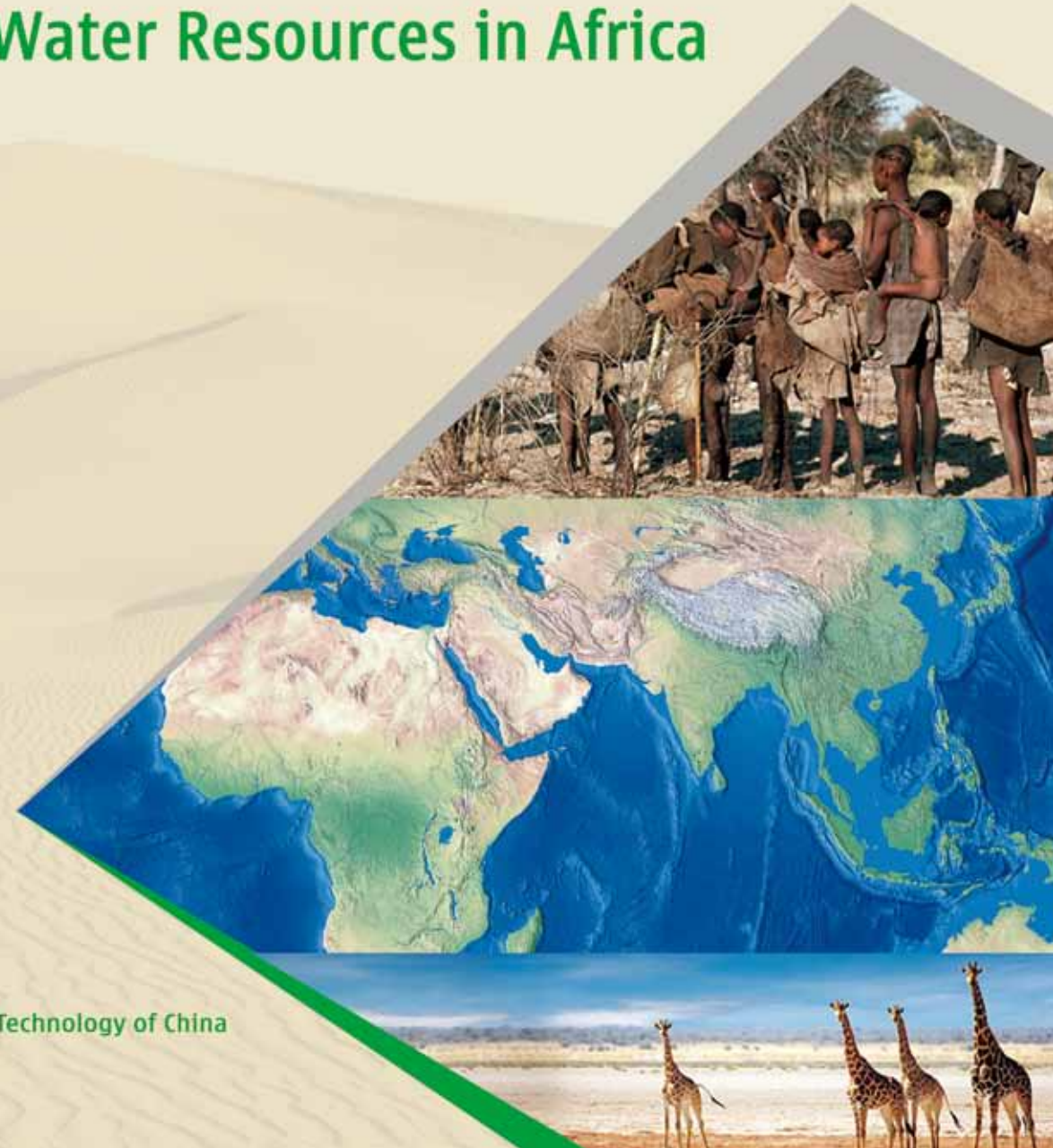
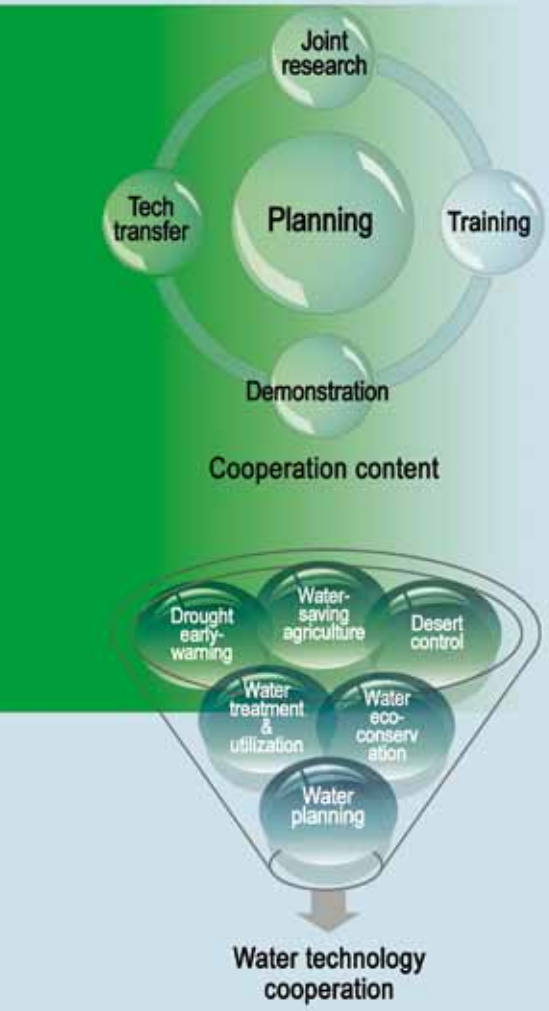
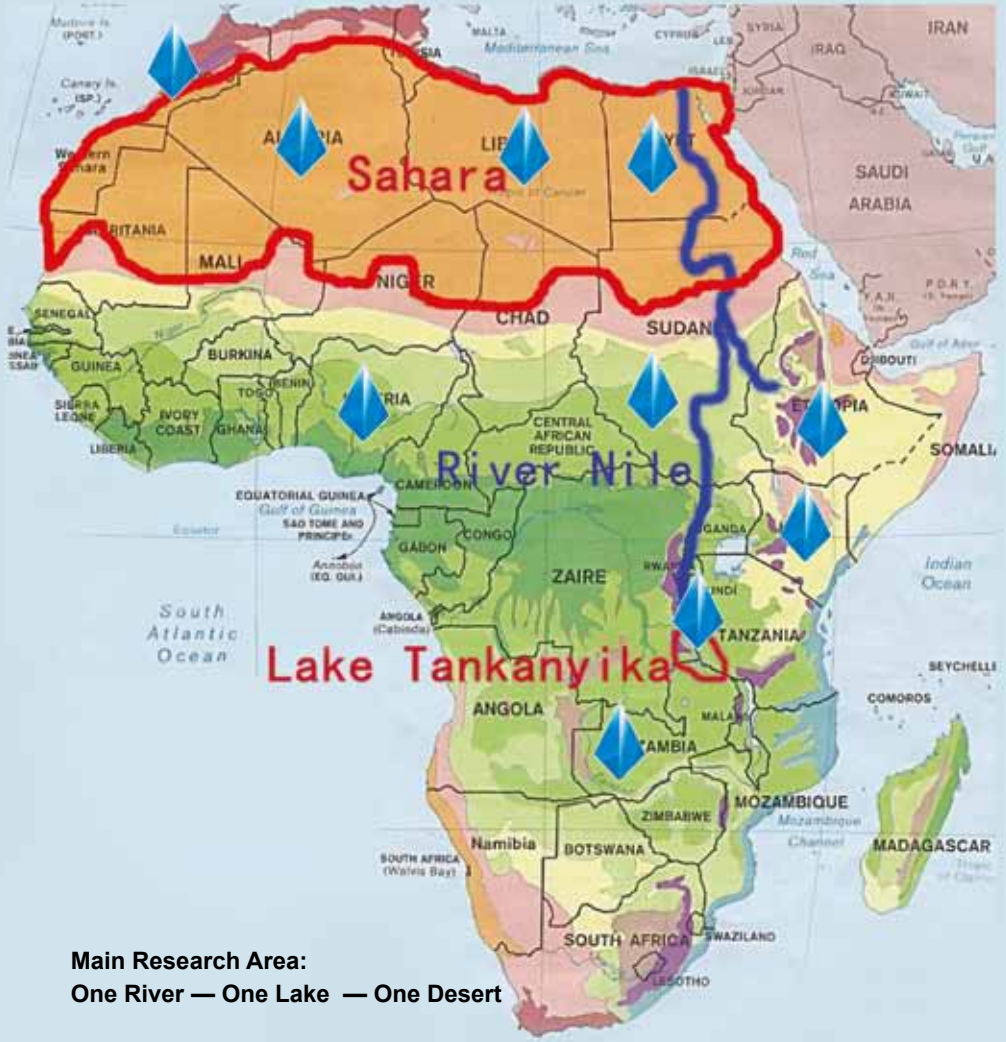
MOST-UNEP Technical Cooperation on Water Resources in Africa



Ministry of Science and Technology of China

MOST-UNEP Technical Cooperation on Water Resources in Africa





Main Research Area:
One River — One Lake — One Desert

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MOST-UNEP Technical Cooperation on Water Resources in Africa

According to the MOU signed between the Ministry of Science and Technology (MOST) of China and the United Nations Environment Programme (UNEP) in 2011, Technical Cooperation on Water Resources has been launched. Based on MOST-UNEP 1st-phase cooperation on environment technology, this initiative aims to promote sustainable development in Africa.

With collaborative efforts between China, the UN and Africa, 6 projects will be launched in the fields of water resources investigation, water resources utilization planning, water environment protection, drought early warning system and adaptation to drought, water-saving agriculture, desertification combating and deserticulture development, focusing on the Nile River, Lake Tanganyika and the desert area in the Sahara. The efforts have leveraged the strengths of both MOST and the UNEP, and taken into full account the urgent needs of African countries and the technological resources of China.

- **The aim is:**
  - To mitigate the adverse effects on Africa brought by the shortage of fresh water, environmental degradation, agricultural issues and climate change
  - To provide technology support to African countries and enable them to realize Millennium Development Goals (MDGs)
- **The focus is to build up capacities of African countries in the following aspects:**
  - policy development, training, technical consulting, research report compilation
  - technology development, transfer, demonstration and dissemination, pilot zones and labs
- **African Partner Countries:**
  - Angola, Burundi, Democratic Republic of Congo, Egypt, Kenya, Mali, Morocco, Nigeria, Tanzania, Uganda, Rwanda, Zambia, etc

Technical Cooperation on Water Resources Planning for African Typical Countries and Catchments

The project component includes:

(1) Technical cooperation on investigation and analysis on water resources status of the Nile basin

(2) Technical cooperation on investigation on water resources status quo of Lake Tanganyika catchments;

(3) Technical support on water resources planning for the African representative country, i.e. Water Resources Planning of Uganda.

(4) Establishment of analysis system for Remote Sense data on water resources survey for African representative country and catchments;

(5) Capacity building for African professionals on water resources management, includes application of Remote Sense for improved management of water resources.

Implemented by Gansu Research Institute for Water Conservancy (GRIWC) and related organizations.

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Safe Water Supply and Demonstration of Water Resources Use in Typical African Countries

To protect and preserve the water resources and ecological environment in Africa, Tongji University has undertaken the project "Safe Water Supply and Demonstration of Water Resources Use in Typical African Countries". The objectives and tasks include: joint research of typical urban and rural water supply security and needs; diagnosis and improvement of treatment technology in typical cities existing water treatment plant; transfer of Urban and rural security drinking water treatment technology; cooperation and demonstration of city safe water treatment technology; cooperation and demonstration of rural drinking water safety technology; cooperation and demonstration of rainwater utilities technology; establish consultation and service, maintenance stations of water resource technology; local technical personnel training and development.

In this project, we will host personnel training for water treatment in Africa (Libya, Egypt, Tanzania, Zambia, Kenya, Uganda, etc.), launch training courses for African water technicians, invite African water management and operational staff to come to China for training, and admit some African students to conduct research in relative areas in Tongji University

Implemented by Tongji University and related organizations.

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Technical Cooperation on Protection of Water Resource and Ecosystem with Typical Countries/Basins in Africa

The project is established related with the joint project of Enhancing Capacity of Monitoring Water Resource of Lake Tanganyika conducted among Nanjing Institute of Geography and Limnology of the Chinese Academy of Sciences, Regional Office for Africa / UNEP, Lake Tanganyika Authority and the four riparian countries from 2008 to 2010, aiming at water resource and ecosystem protection in the typical states/basins in Africa. Technologies adapted to Africa will be studied, involving water monitoring, vegetation ecosystem monitoring and waste water treatment. The project tends to study the status quo of aquatic ecological pressure and sewage disposal, to diagnose and improve the urban sewage treatment plants in typical cities, to establish an Ecosystem Assessment Management system and a database management system for water monitoring, to develop pilot water monitoring laboratories and ecosystem monitoring sites with the support of local government, to demonstrate waste water treatment technologies, and to train the local technicians. It will be implemented by a group of Chinese institutes, including Nanjing institute of geography and limnology, Chinese Academy of Sciences, The Institute of Botany of Chinese Academy of Sciences, Lanzhou University, Tongji University, China University of Geosciences (in Beijing). It concerns the areas of the Lake Tanganyika basin, the Lake Victoria Basin and the Nile River Basin. The major contents of the project could be briefed as the following:

(1) Research on the current situation of ecological pressure and sewage disposal in the selected basins;

(2) Capacity building on water monitoring and a pilot project on regional environment monitoring in the Lake Tanganyika basin;

(3) Techniques diagnosis and improvement of urban sewage treatment plants in typical cities;

(4)Technological cooperation and demonstration on urban sewage disposal;

(5) Ecosystem monitoring network planning and monitoring stations demonstration in typical regions;

(6) Technological cooperation on sewage disposal and soil remediation of oil fields in Africa;

(7) Training of local technicians.

Implemented by Nanjing institute of geography and limnology, Chinese Academy of Sciences and related organizations.

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Drought early warning system and adaptive technology cooperation in drought areas of Africa

The project is aimed at establishing comprehensive drought adaptive technology and strategy for African countries at the state and sub-regional levels. Specifically, it includes establishing networks of academic exchange, cooperation and research, enhancing theoretical research capacity and technology adaptability in agroclimatic, hydrological, modeling and other related areas (drought and climate change); constructing demonstration drought early warning system and drought adaptive technology in typical areas; promoting education and public awareness, and training and cultivating of technical staff. With the implementation of the project, the technical problems in drought early warning in African countries should be resolved, reduction of food production and waste of resources caused by droughts restrained, adaptability of plants and crops to drought enhanced, and sustainable development of agriculture promoted. Breakthroughs and innovations are expected in the areas of drought forecast based on remote sensing data, anti-drought technological system integration and application, and plant adaptability to drought in arid regions.

Implemented by Institute of Agricultural Environment and Resources, Shanxi Academy of Agricultural Sciences and related organizations.

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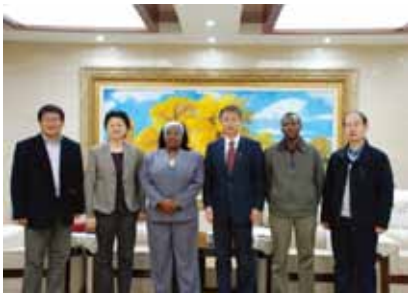
Cooperative Development and Demonstration of Dryland Water-saving Agricultural Techniques in Africa

Arid climate, infertile soil, high population density and serious shortage of grain production are the biggest practical problems which have been encountered by African countries near the equator. The serious shortage in agricultural primary biomass production leads to a constraint in livestock development and extension of agricultural industrial structure, which increases the difficulty for seeking fundamental solution to food shortages and hunger reduction. However, the operating system of smallholders and arid types in African countries near the equator are very similar to those of arid and semi-arid areas of northwest China. Over the past three decades, Lanzhou university have accumulated a series of effective theoretical and practical bases on the aspects of dryland water-saving technology issues under the background



of small farmers operating. The relevant experiences and skills are in full compliance with the actual situation of African countries near the equator. Dryland water-saving agriculture technology is an effective approach to solve the problems of agriculture and poverty in arid countries of Africa. This research will help African countries to increase grain production capacity in drought conditions, while it is helpful for us to gained important insights about issues, constraints, and current situation in agricultural development of African countries, and accumulate the experience for further cooperation. Lanzhou university will carry out research work with cooperator as follows: (1) the status quo of dryland agriculture in target countries of Africa; (2) Planning of water-saving agriculture for target countries of Africa; (3)Demonstration and extension of high water use efficiency and water-saving agricultural techniques; (4)Development, demonstration and extension of culture techniques of high production and drought resistant cultivars of maize and wheat; (5)Training and capacity building for local researchers and technicians in Africa.

Implemented by Lanzhou University and related organizations.

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Technical Cooperation on Desertification Combating and Deserticulture Development in African Desert-stricken Countries

Through bilateral joint research & development as well as technology transfer and demonstration, research on desertification combating will be conducted in African desert-stricken countries, the regional program on desertification combating will be drawn up, research, demonstration & extension as well as trainings on desertification combating and deserticulture development will be conducted. Through these, technicians´ capabilities in desertification combating in African countries will be enhanced, the regional food and environment security can be promoted, people´ s livelihood could be improved. Through the implementation of this project, the scientific and technological cooperation between China and African countries can be promoted, the harmonious development of scientific technologies, economy and trade as well as politics will be gradually realized.

Project activities: （1）Survey on the status quo of desertification in the typical African countries.（2）Plan and design of desertification combating and deserticulture development in the typical African countries.（3）Technical cooperation research, demonstration and popularization of technologies on desertification combating and deserticulture development.（4）Technical trainings and capability building for local technicians.

Countries involved: Algeria, Niger, Egypt, Kenya and Nigeria.

Implemented by Gansu Desert Control Research Institute (GDCRI) and related organizations.

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Supported by MOST, more than 14 Chinese universities, research institutes and companies participate in the projects. Main participants as follows:

- Gansu Research Institute for Water Conservanczy
- Tongji University
- Nanjing Institute of Geography and Limnology, Chinese Academy of Sciences (CAS)
- Institute of Agricultural Environment and Resources, Shanxi Academy of Agricultural Science
- Lanzhou University
- Gansu Desert Control Research Institute
- China Science and Technology Exchange Center
- China Academy of Space Technology
- China University of Geosciences (in Beijing)
- Institute of Botany, CAS
- Northwest Agriculture and Forestry University
- Yuan Long Ping High-Tech Agriculture Co., Ltd.
- Xinjiang Tianye (Group) Co., Ltd
- Xinjiang Institute of Ecology and Geography, CAS

Designated by Ministry of Science and Technology (MOST) of China, China Science and Technology Exchange Center serves as coordinator of the projects.

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中国科技部－联合国环境规划署合作非洲水资源科技合作行动项目简介

2008 年科技部与联合国环境规划署（UNEP）签署了《关于非洲环境技术与机制合作谅解备忘录》。2009 年 4 月双方又签署了《非洲环境合作项目执行协议》，并启动了对非环境技术合作第一阶段 4 个重点项目，项目的全部任务已于 2010 年底基本完成，成效显著，得到了有关国家政府的高度评价。为进一步深化合作成效，2011 年 11 月科技部与 UNEP 签署了新的合作谅解备忘录，启动了以水资源科技合作为主题的对非第二阶段合作项目。

第二阶段合作项目领域涉及水资源规划、水环境保护、水处理利用、干旱预警、节水农业和防沙治沙等方面。　在中国－联合国－非洲三方合作机制协调下，项目通过技术示范与推广、技术培训、技术服务、联合研发、政策研究、科研捐赠等形式开展合作，旨在加强非洲国家在制订政策规划、科研、监测、管理、技术引进消化吸收等方面的能力建设，推动技术转移与示范推广，促进中非在相关领域的合作研究，为非洲国家培养人才。项目涉及一河（尼罗河）、一湖（坦噶尼喀湖）、一沙漠（撒哈拉沙漠），覆盖坦桑尼亚、赞比亚、布隆迪、刚果（金）、埃及、摩洛哥、肯尼亚、乌干达等国家。

项目由甘肃省水利科学研究院、同济大学、中科院南京地理与湖泊研究所、山西农科院农业环境与资源研究所、兰州大学、甘肃治沙研究所等单位牵头实施。

非洲典型流域和国家水资源规划研究

本项目的合作内容包括：
- 尼罗河流域水资源现状调查分析合作研究；
- 坦噶尼喀湖流域水资源现状调查及规划合作研究；
- 为非洲典型国家水资源规划提供技术支持，即，为乌干达国家水资源规划提供技术支持；
- 为非洲典型国家和流域建立水资源遥感数据调查分析系统
- 为非洲专业人员在水资源管理领域提供能力建设，包括遥感技术在水资源管理工作中的应用培训。

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非洲典型国家水资源利用技术合作、开发应用与示范

为保护非洲水资源与生态环境，同济大学牵头负责承办“非洲典型国家水资源利用技术合作、开发应用与示范”项目，该项目主要目标与任务包括：
- 典型城市与农村供水安全与需求联合研究；
- 典型城市现有供水厂处理工艺技术诊断和改进；
- 城市与农村安全饮用水处理技术转移；
- 城市安全供水处理技术合作与示范；
- 农村安全饮水技术合作与示范；
- 雨水集蓄利用技术合作与示范；
- 建立水资源技术咨询、服务、维护服务站；
- 本地技术人员培训和培养。

中方除了在非洲所在国（利比亚、埃及、坦桑尼亚、赞比亚、肯尼亚、乌干达等），对当地水处理技术人员进行培训外，还在国内开设针对非洲水厂技术人员的培训班，邀请非洲水厂管理人员和操作人员前来进行培训，并接收部分非洲留学生进入同济大学从事相关研究。

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非洲典型国家与流域水资源生态保护与技术合作

本项目基于 2008-2010 年由中国科学院南京地理与湖泊研究所、联合国环境规划署非洲办公室、坦噶尼喀湖管理委员会和临湖四国合作完成的“非洲坦噶尼喀湖水环境监测与资源生态保护能力提升”项目而设立，旨在推进非洲典型国家和地区水资源和生态系统保护。主要开展适应于非洲的资源环境技术研究与合作，包括水质监测、植被生态系统监测和废水处理系统。项目由中国研究机构负责实施，包括中国科学院南京地理与湖泊研究所，中国科学院植物研究所，兰州大学，同济大学，中国地质大学（北京）。研究区域涉及坦噶尼喀湖流域、维多利亚湖和尼罗河流域。项目内容概括如下：
- 典型流域生态压力和废水处理现状研究；
- 坦噶尼喀湖流域水质监测能力建设和水质监测网络示范;
- 典型城市废水处理厂工艺诊断和提升；
- 城市污水处理技术合作和示范
- 生态监测网络规划和典型区域监测点示范；
- 油田废水处理和土壤修复技术合作；
- 当地技术人员培训。

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非洲干旱地区干旱预警机制及适应性技术合作

本项目旨在通过国际合作，为非洲国家建立国家级和次区域水平的全面和综合的干旱适应技术战略，主要是构建交流合作研究网络，加强在农业气候、水文、模型及其他相关领域（干旱和气候变化）方面理论研究和技术应用能力；构建典型地区干旱预警体系及干旱适应技术示范；促进教育和提高公众认识，对技术人员培训、培养。通过本项目实施可以解决非洲国家在干旱预警方面存在的技术难题，解决因干旱造成的粮食减产和资源浪费，提高植物和粮食作物适应干旱的能力，促进农业可持续发展。预计项目将在遥感数据干旱预报、抗旱技术体系集成和应用以及干旱区植物适应性方面取得突破和创新。

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非洲地区旱地节水农业技术合作、开发与示范

干旱，土壤肥力低下，人口增加过快，粮食缺乏等是赤道附近非洲国家所遭遇的普遍难题。在过去 30 年中，兰州大学在中国西北的干旱及半干旱区域以提高水分利用为主题进行了大量的理论和实践方面的研究探索，在节水农业技术发展方面积累了大量的经验，并在区域内得到了广泛的应用。赤道区非洲国家的农业生产条件和中国西北地区干旱，半干旱农业区的情形很相似。中国西北地区发展节水农业技术所积累的研究结果和操作技术与非洲相似国家的农业发展需求很吻合，具有极高的推广潜力。因此与非洲干旱，半干旱区域国家进行节水农业技术的合作，开发与示范会对相关国家产生重要的影响。通过合作研究，本研究将主要达到以下目的：

- 典型干旱国家农业现状研究；
- 典型国家节水农业规划设计；
- 高效低耗农业节水综合技术推广与示范；
- 高产耐旱玉米、小麦增产关键技术推广与示范；
- 本地技术人员培训和培养。

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非洲荒漠化国家防治沙漠化技术合作与沙产业开发

项目通过科技援外、联合研发、技术转移和科技示范等手段，在典型非洲国家开展土地荒漠化研究，编制区域荒漠化防治规划，进行防沙治沙和沙产业技术研发、示范推广和人才培训，提高非洲国家荒漠化防治能力，保障区域环境和粮食安全，改善民生，并促进我国与非洲国家开展科技合作与技术研发，推动科学技术、经贸和政治的和谐发展。

主要内容为：

- 典型国家区域沙漠化现状研究；
- 典型国家沙漠化治理和沙产业规划设计；
- 治沙与沙产业技术合作与推广；
- 本地技术人员培训和培养。

项目执行国家为：阿尔及利亚、尼日尔、埃及、肯尼亚、尼日利亚。

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“中国 – 联合国 – 非洲水资源科技合作行动”中方主要承担单位：

- 甘肃省水利科学研究院
- 同济大学
- 中国科学院南京地理与湖泊研究所
- 山西省农业科学院农业环境与资源研究所
- 兰州大学
- 甘肃省治沙研究所
- 中国空间技术研究院
- 中国地质大学（北京）
- 中国科学院植物研究所
- 西北农林科技大学
- 袁隆平农业高科技股份有限公司
- 新疆天业集团有限公司
- 中国科学院新疆生态与地理研究所

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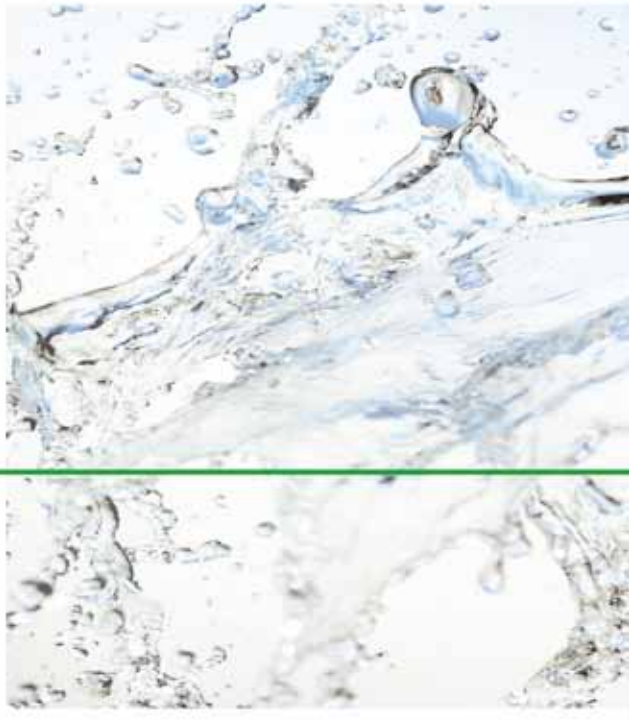
MOST

UNEP

MOST-UNEP Technical Cooperation on Water Resources in Africa





Ministry of Science and Technology of China